BUDGET-BASED CONTRACTS AND TOP-LEVEL EXECUTIVE COMPENSATION: AN EMPIRICAL EVALUATION

By

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Conditional on the different degrees of asymmetry of information, monitoring capabilities, and amount of risk-sharing that characterize relationships between principals and agents, various incentive compensation schemes have been advanced in the academic literature that purportedly optimize the welfare of both principal and agent. The purpose of this study is to examine empirically whether the observed financial rewards reaped by top-level corporate executives appear (given the absence of publicly available data on actual compensation contracts) to be based on the characteristics of optimal contracts.

Different types of incentive compensation models--fixed, linear, and budget-based--are examined for their properties and descriptive validity in this setting. The particular functional forms of the models selected for study are salary plus linear profit sharing, budget-based profit sharing, and the Soviet-type incentive scheme (a version of the budget-based model). Since earnings budgets generated by top management and possibly used by the compensation committees in their evaluation are generally not widely disseminated in the public domain, a surrogate measure is needed for the budgeted value in such cases. Financial analysts' forecasts of annual earnings are used as the surrogate for budgeted earnings.

The primary analysis comprises cross-sectional tests for the budget-based model in order to evaluate the strength of its descriptive validity. Additionally, the model is tested by distinguishing between manager-controlled and owner-controlled firms to capture a possible ownership control effect in the compensation schemes.

Results indicate that corporate practices appear to vary widely. Yet certain broad patterns of association can be identified between top executive compensation and corporate target setting. A company's budget targets and its ownership are found to be important factors in explaining top executive compensation. There have been few empirical studies in the past relating top executive compensation to a corporate budget-based system. The patterns of association identified in this study provide some empirical evidence that certain theoretical propositions from the optimal contracting literature appear to be reflected in actual executive compensation schemes.

CHAPTER I
INTRODUCTION

Several recent studies have recognized the existence and the implications of agency problems in business organizations. Agency problems at the top organizational level arise from the conflict of interest between corporate managers and the owners of the firm. One way to reduce the agency relationship cost is to provide an adequate incentive scheme that can move managers' interests more in line with those of the owners.

Distribution of managerial compensation is an important decision for the company, not simply because of its motivational effect, but also for retention reasons. High compensation may attract a good manager away from another company. However, if the compensation level is too high, people may be retained at too high a cost. Shareholders and other employees may voice their criticism if the compensation level is too high and unrelated to managerial performance.

Because of environmental complexity and behavioral considerations, a reasonably formalized compensation system is essential in all kinds of organizations. A formal system, though difficult to define, is characterized by the establishment of standards which serve to guide managerial compensation decisions. Such a guide can contribute to more consistent, sound and objective decisions. The effectiveness of incentive plans in general depends on the executive's knowledge of the relationship between performance and earnings. The lack of this knowledge is one cause of failure in incentive schemes.

Given the different degrees of information asymmetry, monitoring capabilities, and amount of risk-sharing that characterize relationships between principals and agents, the academic literature has advanced various incentive compensation schemes that purportedly optimize the welfare of both principal and agent. The purpose of this study is to empirically examine whether the observed financial rewards reaped by top level corporate executives appear to be based on the characteristics of optimal contracts.

Different types of incentive compensation models--fixed, linear, and budget-based--are examined for their properties and descriptive validity in this setting. The particular functional form of the model selected for study is a version of a budget-based incentive scheme. A budget-based model is considered a better incentive scheme because, under this model, the performance necessary to obtain a particular bonus is specified ex ante and the agent cannot blame lack of desired performance on variables unobservable to the principal. Executives should have a clear basis for determining whether the effort necessary to attain the desired performance is possible, whether that effort will indeed achieve the performance, and whether the desired bonus will be forthcoming if the performance level is indeed attained.

Actual sales, earnings and earnings budgets of the firm are the variables used in the model specifications. Since the earnings budgets generated by top management and possibly used by the compensation committees in their evaluation are generally not publicly available, a surrogate measure is needed for the budgeted values. Financial analysts' earnings forecasts are considered to be a good surrogate and used in this study.

Top executive compensation data were obtained from Forbes. Salary and bonus were used to measure the compensation variable. The primary analysis consists of cross-sectional tests across firms (during individual years 1980, 1981 and 1982) for the basic models in order to evaluate the strength of their descriptive validity.

In addition to examining the linkages (or lack thereof) between top executive compensation and company target setting, the influence of the firm's ownership structure on executive compensation was also examined. A budget-based compensation system is suggested to be superior under conditions of information asymmetry. Large stockholders in an owner firm appear to have more knowledge of the firm's decision-making process. Information asymmetry should be less significant in an owner firm. Without the existence of the asymmetry condition, a budget-based contract may not be desirable for the owner firms. In the extreme case that a large stockholder is also the top executive, a strong argument could be made for discretionary bonus awards for a top executive which results in uncoupling his pay from current measures of financial performance.

On the other hand, manager firms have higher information asymmetry problems. Small stockholders in the manager firms do not have direct access to comprehensive information about managerial decision-making processes. The budget-control system would be more appealing to them for the motivation and risk-sharing purpose. A stronger effect of a budget-based contract is expected to be found in manager firms than in owner firms.

The remaining chapters of this study are organized as follows. Chapter II is a review of empirical studies related to executive compensation. Chapter III discusses the theoretical models of optimal compensation contracts and formulates a general incentive scheme. Chapter IV assesses the hypotheses and research design. Chapter V discusses the results of this study. Chapter VI provides a summary and conclusion.

CHAPTER II
REVIEW OF EMPIRICAL STUDIES OF EXECUTIVE COMPENSATION

McGuire et al. (1961) investigated the correlation between executive compensation, sales and profits of 45 firms among the largest 100 U.S. industrial companies for the period 1953 through 1959. In their cross-sectional study, the authors found that the level of compensation to the chief executive position correlated with sales but not with profits.

The Conference Board publishes a report on top executive compensation each year. The report, based on a survey of large companies, regresses the salary and bonus of the top executive on company sales (both on logarithmic scales). Their results also suggest that top executive compensation is highly correlated with company sales.

The close relationship of top executive compensation level to sales rather than to profits has come into question more recently. The question whether size (measured by either sales or assets) or profitability (measured by net income or by the rate of return on assets) is the key variable in establishing the level of the executive compensation has been examined by numerous studies. These empirical efforts have tried to determine the dominant objectives behind managers' behavior. The basic economic assumption that managers attempted to maximize the firm's profit was challenged. Proponents of the other side argued that managers actually tried to maximize total sales of the company because their salaries appeared to be far more closely correlated with the size of the firm than with the profitability. A regression relationship was tested with profits and sales being the explanatory variables for executive compensation. If executive compensation was found to be a function of profits but not sales, it could be concluded that the profit maximization hypothesis was supported. On the other hand, if sales was the only statistically significant variable, then the sales maximization hypothesis would be the dominant explanation. These studies' findings have been mixed.

Lewellen and Huntsman (1970) examined the relationship between executive compensation and corporate sales and profits controlling for several statistical problems. To eliminate the collinearity between sales and profits, the independent variables were measured as sales per dollar of assets and profits per dollar of assets. The dependent variable used two different measures for executive compensations: salary plus bonus of the chief executive officers; and the present value of the executives' total compensation. The cross-sectional relationship was examined for 50 companies at three-year intervals beginning with 1942 and ending with 1963. They found that salary plus bonus served as an excellent proxy for total compensation. They concluded that "reported profits are substantially more important in the determination of executive compensation than are sales--indeed sales seem to be quite irrelevant." (p. 718)

Boys and Schlagenhauf (1979) used various functional specifications to examine the relation between executive compensation, corporate sales and profits. They compared a linear model, a log-linear model, and a Box-Cox transformed model. Chief executive officers' total compensation was collected for 782 firms from Forbes for one year, 1976. The results indicated that the best specification was the generalized Box-Cox (GBC) model. There was a significant difference between the linear model and the GBC model. However, the difference between the GBC model and the log-linear model was not significant. In the GBC model and the log-linear model, both profits and sales were found to be significant variables.

Ciscel and Carroll (1980) indicated that most of the differences in previous studies were probably due to differences in data selection, variable transformation, or hypothesized model construction. They used a residual profit measure, which was calculated by regressing profits against sales, to eliminate the problems of simultaneous equation bias as well as the multicollinearity between profit and sales. They then controlled the heteroscedasticity problem by dividing each variable in the model by the square root of assets. The results indicated that both sales and residual profits have a strong influence on the level of executive compensation in large corporations.

The inquiry into the determinants of executive compensation has been dominated by a search for evidence of profit maximization or sales maximization behavior on the part of management. There have been few studies of top executive compensation addressing the concerns of a descriptive model that can explain the pattern of executive compensation.

Murthy (1977) examined the question of whether compensation systems would be influenced by by corporate business strategy. He analyzed the determinants of top executive compensation by controlling for a "business-strategy" variable, the sales variable and the performance variable. Fifty-three firms were classified into three strategy categories, namely, Dominant Business (20 firms), Related Business (22 firms), and Unrelated Business (11 firms). Within each strategy group, firms were classified into two subgroups on the basis of performance so that the compensation characteristics could be contrasted between high-performing and low-performing companies. Two criteria were used jointly for classifying the performance level. They were (i) the average of the ratio of return on stockholders' (book) equity divided by a similar return for large firms in the same industry, and (ii) the annual growth rate in EPS.

The level of top executive compensation was found to vary greatly with sales and, to a smaller yet significant extent, with the financial performance of the firm. Although sales, as well as corporate performance, were significant individually in explaining variations in the level of top executive compensation among different firms, they together explained only a small part of the total variation. After eliminating effects attributable to sales and level of performance, there was no significant difference in the level of compensation that could be associated with the business strategy of the firm.

Nash (1980) reviewed the literature related to managerial compensation and he indicated that organization size was consistently found to be related to managerial compensation in many research studies. Organization size can be measured by sales, number of employees or assets. The larger the organization, the higher the manager's pay tends to be, other factors being equal.

The chief executive officer's compensation also depends on factors such as the firm's access to accurate labor-market information, type of job-evaluation plan in use, manager's personal attributes, job performance, and other factors. Nash indicated that "it is clear from the literature that the higher the level of the job, the higher the performance component in salary raises for managers. The bonus and stock option components of managerial compensation are presumably highly performance related" (p. 20).

Although the validity of the results in previous studies may depend on the extent to which the various authors successfully dealt with the statistical problems, it also suggests the possible inadequacy of the functional form(s) used in the models estimated in these studies.

Descriptions of bonus plans in proxy statements usually specify a bonus pool but not the detailed allocation function. However, the bonus pool in a company is usually decided as a percentage of profits after a prespecified return on invested capital or shareholders' equity has been earned (Kaplan, 1982, p. 574).

Once the total bonus pool is determined, there still remains the question of how to divide it among the executives of the corporation. It seems common to limit those participating in the bonus pool to the top 0.5 percent of salaried employees. Usually, the bonus allocation is reviewed by the Board of Directors or a compensation committee. Although allocation functions are not specified in the proxy statement, at least a part of the bonus distribution depends on the manager's performance. For example, the Zapata Corporation's proxy statement indicates:

> The company . . . provide key executive employees with annual incentive awards for performance measured against predetermined profit objectives. . . . The terms of the plan provide that bonus awards may be paid to key executives as a percentage of base salary on the basis of achievement of certain objectives established . . . at the beginning of each fiscal year. (From the 1984 proxy statement, emphasis added)

Most of the previous studies primarily correlated ex-post profits and sales data with compensation and concluded that executive compensation appeared to be based on the absolute value of either sales or profits or both. The motivational aspects of executive compensation have been virtually ignored. To achieve the motivation and retention objectives of the compensation plan, certain minimum performance levels should be required and specifiedby the board of directors before any reward is given. The question of how pay is affected by sales and profits could be investigated more properly by considering the executive's achievement level requirements.

The purpose of this study is to investigate the possibility that observed top executive compensation is implicitly dependent upon budget-based performance. Previous studies, using cross-sectional tests, have assumed executive compensation to be related only to actual performance. The budget, as a planning and evaluation criterion, has not been used in this context so far.

CHAPTER III
THEORETICAL MODELS OF OPTIMAL COMPENSATION CONTRACTS

Theoretically, the objectives of executive compensation are assumed to be essentially similar across firms. Whether implicit or explicit, most profit-seeking organizations want their compensation system to attract and retain a competent work force which makes maximum current and future contributions to the revenues of the organization at a minimum cost. Constructing suitable incentives is an important problem in organization design. It has been recognized that difficulties in compensation contract design arise not only because the owner and manager may have different attitudes toward risks, but also because the manager derives disutility from his own effort, whereas the owner does not.

A manager's utility is typically assumed to depend on his compensation and effort level. Let c be the amount of the manager's compensation, and e be the action or effort level chosen by the manager. The manager's utility function can be stated as $U_m(c,e)$, that is, the manager's utility function has two elements, wealth and effort. Typically, this utility function is increasing with respect to compensation, i.e., $dU_m/dc > 0$, and the manager may be either risk neutral, $d^2U_m/dc^2 = 0$, or risk averse, $d^2U_m/dc^2 < 0$. On the other hand, since less effort is always preferred to more by the manager, his utility function is decreasing and strictly concave with respect to effort, i.e., $dU_m/de < 0$, and $d^2U_m/de^2 < 0$.

The owner's utility is typically assumed to depend only on his monetary rewards, r, which can be denoted as $U_o(r)$. The owner's utility function is increasing with respect to his monetary reward, i.e., $dU_o/dr > 0$, and the owner is either risk neutral, $d^2U_o/dr^2 = 0$, or risk averse, $d^2U_o/dr^2 < 0$.

Let s be the state of the world, and x denote the payoff to the firm. The payoff in state s with effort e is $x = g(s,e)$. For any state s, it is assumed that $dx/de = dg(s,e)/de > 0$. That is, the higher the effort level, the greater the expected payoff to the firm. The owner pays the manager according to a fee schedule $f(x,s,e)$. This notation indicates that the fee may depend on the payoff x, on the state of the world s, and on the manager's effort e, if these are observable or verifiable by the owner.

Let P_m and P_o be the probability assessments of the state s for the manager and the owner, respectively. The manager, through his choice of action or effort level e, will want to maximize

$$\sum_s U_m\,(f(x,\ s,\ e))P_m\ . \qquad (1)$$

The owner, on the other hand, is looking for a fee schedule, f, such that he can maximize

$$\sum_{s} U_o (x - f(x, s, e))P_o \,. \qquad (2)$$

In expression (1), the manager's fee will depend indirectly on the uncertain state of the world in that payoff depends on the state. This induces risk into the manager's compensation. Designing an incentive scheme for the manager is a problem of bringing the risk preference of the manager into line with that of the owner. Besides the risk problem, the manager's disutility for effort is also an important factor in determining efficient incentive contracts. A poor payoff for the firm can be due to two things: an unfortunate state of the world, or a low effort level chosen by the manager. If the owner cannot observe the effort level, then the manager may be tempted to select an improper effort level and claim that the bad outcome was due to an unfortunate state of the world. This is the essence of the moral hazard problem.

The crucial ingredient of the principal-agent setting is designing the fee schedule to be paid by the owner to the manager for making and implementing decisions. An optimal incentive device triggers an action by the manager that minimizes or eliminates the moral hazard problem. Various incentive contracts and their properties are examined in this section. Managerial compensation contracts that have been analyzed in the literature include pure-wage contracts, pure-rent contracts, salary plus profit-sharing contracts, bang-bang contracts, budget-based contracts, and the so-called Soviet incentive contracts. These contracts are discussed under the following headings:

(1) Salary plus profit-sharing contracts.

(2) Budget-based profit-sharing contracts.

(3) Soviet incentive contracts.

Salary Plus Profit-Sharing Contracts

It has been shown in the literature (Wilson, 1968; Berhold, 1971; Ross, 1973) that whenever the owner and the manager have identical probability assessment of the state and have either exponential utilities, logarithmic utilities, or power function utilities with the same power, then the pareto-optimal sharing rule is linear, and an optimal contract includes a sharing of actual profits between the owner and the manager.

The salary plus profit-sharing function that is often used in practice is a version of the linear scheme and can be defined as

$$C = a + bY$$

where total compensation C is comprised of a fixed payment a, and a variable payment bY, where Y denotes the actual "performance" or outcome.

Choice of the parameter b allows for several characterizations of the schedule. If $a > 0$, and $b = 0$, this is a pure wage contract. If $a < 0$, and $b = 1$, it is a pure rent contract. If the manager is risk-neutral, then the optimal fee schedule for the manager is the rental form, that is, $C = Y - a$, where a is the constant rental fee paid to the owner. In this case, the manager bears all the risk of the uncertainty. He pays the owner a fixed fee and receives the actual payoff less this fixed fee as his own compensation.

The pure rent and pure wage contracts are two extreme cases of incentive design. Pure wage contracts have been criticized as not providing sufficient motivation for the manager. Also, it may not achieve optimal risk sharing if the owner is risk-averse. The manager who prefers less effort to more will likely choose to spend the minimum level of effort under the information asymmetry condition.

In a setting characterized by a high level of asymmetry and a lack of adequate monitoring of the agent's effort, the imposition of risk sharing on the agent becomes the primary vehicle to induce adequate motivation on the part of the agent. As a result, most companies tie the compensation of the top executive to actual achievement (or its accounting measurement) in order to induce motivated effort. Therefore, it is reasonable to drop the pure wage and rental contracts from our study.

Note also that in the case of bankruptcy, owners might lose all their investment in the firm and the manager usually bears only a tiny portion of the cost of bankruptcy. Given the minute probability of loss for the manager, the assumption in the rental form contract that the manager shares all the risk is not met. One may argue that the manager could also be an equity holder and hence he would share a large risk in the case of bankruptcy. However, in this circumstance, it is doubtful that anyone would be risk-neutral over such a sizable span of wealth. If the manager's risk-neutral assumption does not hold, then a rental form contract will not remain Pareto optimal. It will be an irrational choice by both owner and manager.

Nonobservability of the state and the manager's effort level coupled with manager's risk aversion will force the owner and the manager to agree to contracts which provide a balance between risk sharing and incentive effects. A salary plus profit-sharing contract imposes some risk on the manager in order to provide an incentive for the manager to expend some agreed level of effort.

Budget Based Profit-Sharing Contracts

Demski and Feltham (1978) have demonstrated that if the state and the worker's effort level are unobservable or costly to observe, a budget-based contract can be Pareto superior to a salary-plus-profit-sharing contract.

They indicated that budget-based compensation not only can induce more effort from the worker, but it can also help screen out potential workers of lower-than-desired skill (since such individuals are less likely to meet the standard).

Studies in expectancy theory (Ronen and Livingstone, 1975; Locke et al., 1981) support the notion that specific and challenging standards can induce higher performance, and that performance-contingent compensation appears to have a motivating effect on performance.

According to the expectancy theory, a manager will strive to attain a goal on the basis of the sum of intrinsic and extrinsic rewards (utilities) that he derives from the outcome. The extrinsic rewards associated with budget accomplishment and the intrinsic value which may derive from less ambiguity in the structured task will affect the manager's motivation to meet the budgeted performance levels. Theoretically, high correlation is expected between the extrinsic rewards and the effectiveness of the budget system.

Today, the most widely used type of accounting system among well-managed organizations is a budgeting system that includes both expected and actual results. The effectiveness of these budgets as a motivational tool depends on the relative importance attached to them in performance evaluation. How the extrinsic rewards are incorporated in top management motivation systems is the focus of this study.

Different types of budget-based compensation contracts suggested in the literature include nonconstant budget-based profit sharing, the so-called "bang-bang" contract, and the "Soviet-type" incentive contract. The nonconstant budget-based profit-sharing contract was examined by Atkinson (1978). Under this incentive device, a reward is distributed to the manager based on a target or standard level of profits which must be attained before the manager receives any share of the profits. The manager's reward consists of a fixed wage a, and a share of the difference between the realized outcome Y, and the standard outcome F. It can be expressed as follows:

$$C = a + b(Y - F)$$

Compensation is considered to be a function of one variable--the achievement of the budget outcome.

The bang-bang contract is a constant wage contract except for a finite number of discrete jumps. It is defined as

$$C = \begin{cases} a & \text{for } Y < F \\ w & \text{for } Y \geq F \end{cases} .$$

The manager is paid a higher compensation w if the budget is achieved and a lower compensation a if the budget is not achieved. If the penalty for not achieving the budget, i.e., (w-a), is large enough, managers will devote adequate effort to reach the budget. Since $w > a$, we can let $w = a + b'$; then the bang-bang contract can be rewritten as

$$C = \begin{cases} a & \text{for } Y < F \\ a + b' & \text{for } Y \geq F \end{cases} .$$

This model can be expressed by the budget-based profit-sharing model suggested by Atkinson, $C = a + b(Y - F)$; in the case of $Y < F$, let b equal to zero; and if $Y \geq F$, then $b(Y - F) = b'$. Since Atkinson's model is more general and the bang-bang contract is one possible type of Atkinson's general class, this study will use the model suggested by Atkinson to represent this type of budget-based profit-sharing contract.

It has been argued that if the compensation contract is based on expected performance, a manager can obtain the maximum amount of compensation with the minimum effort by manipulating (falsifying) the budget estimate which is partially under his control. The ability of the compensation contract to motivate the manager and to achieve optimal risk sharing is often hampered because of such target misrepresentation, and managers and shareholders may find themselves locked into the tense roles of adversaries in a gaming situation. However, a mitigating factor is that external validation is possible in terms of comparing the target estimated by the manager with the target estimated by an independent party such as a financial analyst (or targets worked out by similar sized firms in the same industry). The separate professional target provided by an independent party can be very useful to a board of directors for comparison. Another scheme suggested in the academic literature to improve the truthful estimation is the Soviet incentive model.

Soviet (Reward/Penalty) Incentive Contracts

The central planners of the Soviet Union appear to have devised and implemented a system of bonuses that rewards both accurate budgets and outstanding performance. This system is highlighted by Weitzman (1976) and further discussed in Kaplan (1982). Formally, the plan can be described as

$$C = \begin{cases} a + b\,F + u\,(Y - F) & \text{for } Y \geq F \\ a + b\,F - v\,(F - Y) & \text{for } Y < F \end{cases}$$

where a is the basic payment established by the compensation committee,

Y is the actual outcome,

F is the budgeted outcome, and

b, u, v are positive parameters such that $0 < u < b < v$.

The manager declares a budget F and this increases the bonus by b(F). If the actual outcome Y exceeds the budget level F, an additional bonus of u(Y - F) is distributed to the manager. But u is set less than b, so that an increase in the declared budget can give the manager higher compensation than he would gain by realizing and exceeding a given lower budget. If the actual outcome Y is less than the budget, a penalty of v(F - Y) is subtracted from the bonus. In this case, v is set larger than b, so that an improper overestimation will result in less compensation than that from an accurate budget.

For any actual outcome Y, the highest bonus is achieved when the budget F equals Y. To maximize his bonus, a manager should try to budget or "forecast" accurately. Any other forecast will decrease the bonus below the maximum achievable level. Also, the parameters are established so that overestimation is penalized more heavily than underestimation is compensated. The compensation committee can adjust b, u, and v to control the manager's motivation.

Loeb and Magat (1978) showed that the performance indicators suggested in the accounting literature for use in performance control by Western firms are essentially the same as the indicators presumably used in the Soviet Union. We can simplify the Soviet model in order to examine the similarities between the Soviet model and the model suggested in American business.

Since $0 < u < b < v$, let $u = b - m$ and $v = b + n$; then the Soviet incentive model can be rewritten as

$$C = \begin{cases} a + b F + (b - m)(Y - F) & \text{for } Y \geq F \\ a + b F - (b + n)(F - Y) & \text{for } Y < F . \end{cases}$$

Simplifying further we get

$$C = \begin{cases} a + b F + b(Y - F) - m(Y - F) & \text{for } Y \geq F \\ a + b F - b(F - Y) - n(F - Y) & \text{for } Y < F \end{cases}$$

or,

$$C = \begin{cases} a + b Y - m(Y - F) & \text{for } Y \geq F \\ a + b Y - n(F - Y) & \text{for } Y < F . \end{cases}$$

This type of function has been suggested in the accounting literature by Ijiri et al. (1968) and has been further studied by Barefield (1969), Loeb (1974), and Itami (1975). The performance evaluation function suggested in these studies is as follows (Itami, 1975, p. 82):

$$C = b Y + k(Y - F)$$

where b is a nonnegative constant and k is the parameter for reward or penalty related to the deviation from the budget, $(Y - F)$. If $k(Y - F) > 0$, it is a reward; otherwise, it is a penalty. The only difference between the Soviet incentive model and the model suggested in

American literature is the determination of the parameters.

Another version of budget-based contracts is the so-called dichotomous contract, explained by Demski and Feltham (1978) as follows:

$$C = \begin{cases} a + b\,Y & \text{for } Y < F \\ w & \text{for } Y \geq F \end{cases}$$

In this contract, the manager is paid a linear share of the outcome, i.e., (a + bY), if the budget is not achieved, and the amount w, if the actual outcomes are higher than the budget.

Since $w > a + bY$, we can assume $w = a + bY + k'$, $k' = k\ (Y - F)$, and rewrite the contract as

$$C = a + b\,Y + k(Y - F)$$

If $Y < F$, then $k(Y - F)$ can be set to zero; and if $Y \geq F$, $k(Y - F)$ is set equal to some positive value. Again, this contract can be expressed by the model proposed by Itami and other studies.

In summary, most of the compensation contracts discussed in the literature can be represented as the following three functions:

(1) Salary plus profit-sharing model

$$C = a + b\,Y$$

(2) Model proposed by Atkinson and bang-bang model

$$C = a + b(Y - F)$$

(3) Model proposed by Ijiri et al., Soviet incentive model and dichotomous model

$$C = a + b\,Y + k(Y - F)$$

This study uses a cross-sectional test to examine whether executive compensation is related to budget-based performance. A general model $C_t = a_0 + a_1 Y_t + a_2 (Y_t - F_t)$ is examined as the representative model in gauging the descriptive validity of observed compensation practice.

One obviously cannot expect the same functional form for compensation contracts across all firms. To identify the individual models used by individual firms is not the purpose of the current study. When data become available for a longer period of time for the same firm, then a time-series test can be run to check on the apparent use of individual models for each firm.

The emphasis of this study lies in its explanation of how financial reward systems for top executives are influenced by the target setting of the enterprise. The budget system can and should be used to influence decision-making behavior. This study examines how much of top executive compensation can be traced to the expected target of the company and whether the company's ownership structure would influence its compensation strategy. The general methodology followed in this evaluation is described in the next chapter.

CHAPTER IV
METHODOLOGY

Compensation Mix

The compensation package of the top executive officers typically includes base salary, bonus, an assortment of nonperformance-related fringe benefits, and other long-term incentive plans. A different mix of executive compensation is used to achieve different compensation objectives which include the motivation of performance and satisfaction of managers so they will be attracted to and remain with the organization. The contribution which each of these types of payment makes to the compensation objectives will be discussed individually.

Salary

Starting salary is usually related to labor-market competition and external economic conditions, rather than individual performance. The manager's current salary is heavily influenced by such factors as organizational size, labor market, personal attributes, etc. The performance component is probably a small portion of an individual manager's salary payment relative to the above factors. However, it undoubtedly has a major impact on the rate of salary increase for the manager. The salary raise for individual managers is presumably highly performance related.

Bonus

Bonus is defined as lump-sum payments highly related to perceived recent performance. They are a frequently used form of compensation primarily awarded to the higher-ranking managers in a company. From the company's perspective, bonuses should be superior to base salary from a motivational standpoint. They are tied more closely to the ability of the company to pay, based on its profit performance of the year. However, whether bonuses actually achieve the positive results expected of them depends on how they are administered. The performance requirements need to be clearly defined. If the performance expectation is not clearly and precisely defined, the managers may feel there is too great a risk that performance results will be misjudged or inaccurately measured and thus refuse to take the risk. On the other hand, if the performance necessary to obtain a particular bonus payment and the magnitude of the potential bonus are accurately specified, the manager should have a clear basis for determining whether the effort necessary to attain the desired performance is possible, whether the effort will indeed achieve the performance, and whether the desired bonus will be forthcoming if the performance level is attained.

Fringe Benefits

This form of compensation includes various fringe benefits and perquisites. Fringe benefits include health and life insurance, contributions to the retirement program, and payment for time not worked (vacations, holidays, sick leave, severance pay, and so on). Perquisites are a varied assortment of privileges and services provided to the upper level managers, such as cars, country-club memberships, and use of company airplanes.

From the perspective of motivation, the main impact of perquisites is to enhance the manager's efforts to a level where he or she will receive the privileges. Fringe benefits contribute less to the performance-motivation objective of companies than any other compensation, mainly because they have virtually no relationship to performance. They are received as long as the employee remains with the company. Therefore, these forms of compensation are made to contribute to the retention purposes.

Long-Term Incentive Plans

A significant portion of managerial compensation is distributed in the form of stock options, stock appreciation rights, performance shares, or participating units. Stock options and stock appreciation rights relate managerial compensation to the price of stock. It is a long-term reward based on stock price increase. Performance shares are stock bonuses with right to stocks contingent on achieving certain long-term operating goals. Participating units are deferred cash bonuses which promise to pay in the future an amount determined by the long-term operating results. These long-term incentive plans are primarily used to achieve compensation objectives, including executive retention and motivation of long-term performance. They are thought to contribute to the retention objective in that managers tempted to leave the organization might be discouraged if their options were sacrificed and they anticipated significant increases in contingent payment or the company's stock price in the future.

From a motivational perspective, the main deficiency of stock options and stock appreciation rights is that the link between effort and reward is quite weak because no matter how much effort managers may expend, there is no one-to-one causal relationship between a manager's actions and stock price performance. The stock price may fluctuate because of many noncontrollable random events, such as government actions, general economic conditions, and international events. Therefore, stock price variations may not provide reliable feedback on the quality of a manager's decisions and exerted efforts.

The satisfaction obtained by individual managers may be high or low depending on how much the stock price increases and how closely it is related to what was expected. If the appreciation in stock price is low, then dissatisfaction will undoubtedly be high for most managers.

The recent increase in the use of performance shares or participating unit incentive plans is partially responsive to this problem by linking executive rewards to measures not related to the price of stock.

In summary, different compensation elements have different time horizons. Salary raises and bonuses could be regarded as a reward for current performance, while other components such as stock options and deferred compensation are regarded as rewards for future expected performance.

This study examines the achievement of the budgeted performance where the one-year-ahead earnings performance target set up at the beginning of the period is compared to the actual performance of the current period. This is an evaluation of current year performance. Salary and bonus are the major components in executive compensation that is directly related to current performance evaluation, since they are tied more closely to the company's operating results for the current year. This study will use salary and bonus as measures of executive compensation to assess the effect of target-setting on compensation.

Lewellen and Huntsman (1970) provided additional support for using salary and bonus alone as a measure of top executive compensation. They selected two measures of top executive compensation to explore the relationship between executive compensation and the company's profits and sales. The first measure was salary plus bonus, while the second was the present value of the executive's total compensation which included the appreciation of stockholdings, whether potential or actualized. They found that regressions utilizing salary and bonus payments alone as a measure of executive compensation yielded better regression fits than did those employing total compensation. They indicated that "a sizable proportion of total compensation is attributable to compensation arrangements whose values depend importantly on short-term fluctuations in employer-company share prices--stock options, for example. Because these short-term fluctuations reflect a host of random influences, the total compensation figures embody a considerable noise component" (p. 717).

Dependent Variable

Salary plus the bonus earned by the single highest-paid manager in each firm (of each year) is selected as the dependent variable. Only the pay of a firm's top executive is considered because published data on managerial compensation for job levels below the chief executive officer are increasingly more difficult to obtain and interpret. It is also clear from the literature that the higher the level of the job, the higher the performance component in the total compensation (Nash, 1980, p. 20). The top level manager's compensation is therefore an appropriate variable for this study.

There is usually a substantial change in the compensation level whenever there is a change in the top executive(s). A change in the top executive may have other complicating implications. Therefore, only the same individual who occupied the top position throughout the period of study was included in the sample. Following the compensation of the same person in the same position was preferable to following just the top executive position, although the resulting sample was smaller.

Independent Variables

The general model advocated in the literature, $C_t = a_0 + a_1 Y_t + a_2 (Y_t - F_t)$, does not specify the measure of Y. Y was generally defined as the "outcome" of the companies. Several recent studies (Ciscel and Carroll, 1980; Boys and Schlagenhauf, 1979) found both sales and profits to be significant variables in explaining top executive salary and bonus. Therefore, this study considered both profits and sales as the outcome of the company.

Companies usually use a profit target to determine their product price or advertising budget. Achievement of the profit target was therefore considered the overall goal of the company, which includes both cost control and sales expansion. Due to the importance of the profit target, budgeted profits were used to derive the budgeted achievement variable, $(Y_t - F_t)$, and actual sales were used to represent the second term in the general model, Y_t, the total value of the company's outcome.

Budget Achievement Variable

Although the preparation of internal budgets is a routine activity in most companies, very few firms choose to directly disclose their profit forecasts. Managers appear to prefer indirect channels to reveal their forecast information. A survey conducted by Lees (1981) for the Conference Board indicated that a vast majority of companies provide either moderate or substantial assistance to financial analysts in their forecast preparation. Companies make a special effort to assist the analysts by making available background information on company operations, and by granting interviews to analysts. Analysts expend great effort in digging out information on which forecasts may be based. The most important source of their information is their communication with company managers.

Several studies (McDonald, 1973; Basi et al., 1976; Lorek et al., 1979) have examined the accuracy of external forecasts. Their results indicate that management forecasts were only marginally more accurate than forecasts made by financial analysts, and hence the latter were a good proxy of the former.

In addition to the close relationship between analysts' forecasts and management forecasts, another reason which supports using analysts' forecasts as a surrogate is the independent attribute of the analysts' forecasts. Given that the manager has incentives to misrepresent the target setting for his personal benefits, the board of directors needs an external validation to assess the truthfulness of the manager's forecast. An analyst's estimation can serve as a good reference for the board of directors. It may also block the manager's motivation for nontruthful reporting.

Since getting access to a company's internal forecast is virtually impossible, this study used analysts' forecasts of profits as surrogates of internal budgets (forecasts). Forecasts made in the first quarter of each period in the Value Line Investment Survey were adopted for this purpose.

Also, since very few firms release management forecasts of profits on a continuous year-to-year basis, the use of direct management forecasts is not feasible for this study.

Reported annual profits of each company were used for the required comparison with the budgeted profits. The budget achievement variable was computed as actual profits minus the inferred budgeted profits for all companies, and in some sense represents the "net" outcome for the company.

Sales

Reported annual sales were used to represent the total value of the company's outcome, and also control for the fact that organization size may be one of the determinants of compensation level.

Hypotheses

To examine the importance of the budgeted achievement variable, the following hypothesis was tested:

H_{01} : Top executive salary and bonus is not a function of the degree of achievement of the firm's budgeted performance.

H_{a1} : Top executive salary and bonus is a function of the degree of achievement of the firm's budgeted performance.

The first hypothesis examined whether a budget-based incentive contract which considered risk-sharing between the owner and the manager was the general format followed by the company's compensation committee in setting the compensation contract. The general model discussed in

Chapter 3 was used for the cross-sectional test:

$$C_{it} = a_0 + a_1 S_{it} + a_2 D_{it} + e_{it}$$

where

C_{it} is the top executive's salary and bonus for firm i in period t;

S_{it} is the observed sales of firm i in period t;

$D_{it} = P_{it} - F_{it}$, that is, D_{it} equals observed profits, P_{it}, minus budgeted profits, F_{it};

e_{it} is the residual term.

Theoretically, according to the model proposed by Ijiri et al., the sign of a_2 for a given firm should be positive. However, the lack of time series data on firms has required a cross-sectional test, and this may lead to a problem in interpreting observed coefficients. For example, small firms with positive budget achievement may distribute less compensation than large firms with negative budget achievement. Hence, given the cross-sectional test, the sign of a_2 is not clear. The first hypothesis only examines whether the budget achievement variable plays an important role in top executive compensation.

Ownership

A budget-based compensation contract has theoretically been shown to be Pareto superior under conditions of information asymmetry. However, if a firm is owner-controlled, that is, at least one party holds a majority of the voting stock of the firm, the information asymmetry problem will be less significant. In this case, a budget-based contract may not be either necessary or desirable for the firm. The large stockholders in an owner firm appear to have more knowledge of the firm's decision-making process. Their opportunity of getting access to more complete information, their awareness of the economic and industrial conditions, and their superior financial advice enable them to evaluate top executive performance more directly. As an example, large stockholders are in a better position to identify controllable and noncontrollable events, and therefore will be less likely to hold manager responsible for noncontrollable events.

In the extreme case where the large stockholder is the top executive, he can have direct influence on the compensation decisions. Under this situation, a strong argument can be made for discretionary bonus awards in owner firms which result in uncoupling the manager's pay from the measure of financial performance.

On the other hand, in a manager firm (a firm which is not controlled by any group of owners) the information asymmetry problem is more serious. The small stockholders in a manager firm usually do not have sufficient

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information about the firm's actual decision making. They have only limited access to the company's records. One way to enforce their goals on management effectively is to motivate the managers with a budget-based compensation contract. Top executive compensation is thus expected to be significantly influenced by target setting in a manager firm.

Accounting researchers have recently argued that managerial compensation contracts influence managerial decision making and thus induce manipulation of accounting income (Watts and Zimmerman, 1978; Hagerman and Zmijewski, 1979; Zmijewski and Hagerman, 1981). Accounting studies also postulate that executives of manager firms and owner firms are pursuing different objectives which are reflected in the accounting choices they make (Smith, 1976; Dhaliwal et al., 1982). Manager firms are found to smooth income more often than owner firms. The assumption in these two streams of research suggests that top executives of manager firms have more incentive to manipulate accounting income, and one reason behind this manipulation is their compensation plan.

The suggestion that top executives in manager firms try to enhance their compensation by cosmetic accounting changes implies that the manager cannot easily change the compensation committee directly. Note, however, that this argument presumes that the compensation committee cannot completely see through the manipulations of management. Discretionary accounting changes or income smoothing behaviors are expected from manager firms because managers cannot directly manage their own compensation, hence they try to influence the compensation committee by managing accounting reports.

Following the assumption that top executives in manager firms cannot decide their own compensation, the second hypothesis tests whether the budget-based contract is more desirable in the manager firms than in owner firms. Manager firms are expected to be influenced because of their information asymmetry problem. The second hypothesis may be stated as follows:

H_{02} : There is no difference between owner firms and manager firms in utilizing a budget-based compensation system.

H_{a2} : Top executive salary and bonus are more strongly related to the degree of achievement of the firm's budgeted performance in manager firms than in owner firms.

The control type used in this study is very similar to that previously employed by Smith (1976). The term "control" refers to the power to determine the policies guiding the corporation. A firm is classified as owner-controlled if one party owns 10 percent or more of voting stock. And it is classified as manager controlled if no single block of stock greater than 5 percent is controlled by any party.

Reward or Penalty

Theoretical models indicate that a reward should be distributed to the managers in case of positive budget achievement, and a penalty should be levied in case of negative budget achievement.

A cross-sectional test with salary plus bonus as the dependent variable cannot assess the reward or penalty parameter because each company has a different scale of compensation payment. Companies which are penalizing their managers may distribute salaries and bonuses higher than those of the smaller companies. On the other hand, small companies which are rewarding their managers may still pay lower salaries and bonuses than large companies. Simply scaling the compensation measure by some size proxy cannot completely neutralize this inherent bias in the cross-sectional approach. Companies vary a lot in the level of executive salary and bonus compensation. To assess the existence and viability of the reward or penalty parameter, a relative (year to year comparison for same firm) measure of salary and bonus for each company was used as the dependent variable. This model effectively considers limited time-series aspects by using the changes of compensation as the dependent variable.

Each company's relative salary and bonus was computed as its current salary and bonus minus its three-year average salary and bonus. The use of an average over the period of this study (1980-1982) to compute the relative measure of salary and bonus enabled a more uniform treatment of the economic conditions of different years. A relative measure considered higher or lower than average as a reward or penalty alleviated the influence of high-low swings in compensation. The dependent variable of each company was measured on the same basis to examine the following hypothesis.

H_{03} : Top executives' rewards or penalties are not related to their positive or negative budget achievements.

H_{a3} : Companies with positive budget achievements distribute rewards to their top executives while companies with negative budget achievements penalize their top executives.

The model used to examine this hypothesis was:

$$R_{it} = b_0 + b_1 S_{it} + b_2 \mid D_{it} \mid + e_{it}$$

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where

$R_{it} = C_{it} - \bar{C}_i$, and $\bar{C}_i = (C_{i(t-1)} + C_{it} + C_{i(t+1)})/3$.

S_{it} is the observed sales.

$|D_{it}| = |P_{it} - F_{it}|$, $|D_{it}|$ is the absolute value of the budget achievement variable; that is, if $P_{it} > F_{it}$, then $D_{it} = P_{it} - F_{it}$; if $P_{it} < F_{it}$, then $D_{it} = F_{it} - P_{it}$.

e_{it} is the residual term.

The third hypothesis incorporates some aspect of time series tests by examining changes of compensation within the same firm. This measure improves the testing of reward and penalty parameters because executive compensation may be noncomparable across firms. Under this test, parameter b_2 for positive budget achievement groups is expected to be positive, while it is expected to be negative for the negative budget achievement groups.

Again, the influence of the company's ownership on its reward or penalty parameters was examined by the following hypothesis:

H_{04} : There is no difference between owner firms and manager firms in their system of rewarding or penalizing top executives based on positive or negative budget achievements.

H_{a4} : Manager firms reward or penalize their top executives on the basis of positive or negative budget achievements while owner firms do not.

The sample was first classified into positive or negative budget achievement groups; then insider ownership was used to partition the firms in each group into manager-controlled or owner-controlled firms. Owner firms are expected to be less correlated with the budget achievements. For this test, parameters for the positive and negative budget achievement in manager firms are expected to be significant. On the other hand, they are expected to be insignificant (or less significant) in the owner firms.

Statistical Problems

Lewellen and Huntsman (1970) indicated that a significant statistical problem related to including both sales and profits as independent variables: "those firms relatively large by virtually any scale criterion were also characterized by relatively high sales and profits levels. This scale-associated linkage between the independent variables (sales and profits) poses the threat of serious collinearity, with resultant difficulties in estimating the separate influences of those variables" (p. 712). The economies of scale induced serious statistical problems in the tests of top executive compensation. The

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other major problems indicated in this series of studies were multicollinearity and heteroscedasticity.

Like multicollinearity, the presence of heteroscedasticity does not bias the estimate of the coefficients themselves; but because the ordinary least squares estimate is inefficient, tests for the significance of variables are unreliable. In order to control for heteroscedasticity, certain weighting systems were used by the previous studies to deal with this problem.

Heteroscedasticity exists if the variance of the error term of the regression model is nonconstant. The possibility of heteroscedasticity arises when the variance of the error term varies systematically with some scale factor, k_{ij}, such that $\sigma_e^2 = \sigma^2 . k_{ij}$, where σ^2 is the homoscedasticity portion of the residual variance σ_e^2 . Different methods of tests of heteroscedasticity have been suggested in the literature (Glejser, 1969; Goldfeld and Quandt, 1965). With any of these tests, the question is always what to do after the tests. If one rejects the hypothesis of homoscedasticity, one has to make the appropriate assumptions about the nature of heteroscedasticity.

Different approaches have been used by previous studies to control the above mentioned problems. Lewellen and Huntsman suggested solving them by using the company's assets as a deflator to the regression model. They claimed that dividing the linear function by a measure of the company's assets tended to reduce both heteroscedasticity and collinearity problems.

A log-linear transformed model was adopted by several earlier studies to deal with this statistical problem. Lewellen and Huntsman (1970) tested the efficiency of the log-linear model and claimed that the results of the test of the log transformation on executive compensation and the company's sales/profit variables still suggested the presence of excessive heteroscedasticity.

Ciscel and Carroll (1980) controlled the problems in a different way. They used a residual approach to control the multicollinearity problem. The functional dependence between the independent variables, company's sales and profits, was controlled by regressing profits on sales and using both the residual of profits and sales in the modified regression model as the new independent variables. The multicollinearity between sales and profits was fully controlled with this approach, but the economic meaning of the variables was also changed. Since the observed profits are replaced by the residual of profits, the model is testing the relevance of profits induced by cost saving (or increasing technical efficiency) instead of profits themselves.

Heteroscedasticity was controlled by deflating all variables in the model by the square root of assets. Ciscel and Carroll claimed that the best deflator for correcting the heteroscedasticity was not the company's total assets but the square root of assets.

The procedures adopted for controlling multicollinearity and heteroscedasticity in this study are detailed in the next chapter. The multicollinearity problem was essentially controlled by the residual approach as suggested in Ciscel and Carroll's paper. The Glejser test was used to examine for heteroscedasticity. Under this method, the absolute value of the residuals, e_{it}, was regressed on some form of the correcting variable, X_{it}. That is, $e_{it} = a + b X_{it}$ was estimated with X_{it} being company i's total assets, square root of assets, or other size proxy. If a significant coefficient, b, is obtained, then the variance of the error term is proportional to the independent variable, X_{it}. All variables in the original model should therefore be scaled by X_{it} to correct for heteroscedasticity.

Data

Forecasts of annual company earnings made by financial analysts in the first quarter of each period (the variable F_{it}) were collected from the Value Line Investment Survey for years 1980 to 1982. Forecasts made at the beginning of each annual period are of interest in this study.

The percentage of insider ownership which was used as the cutoff to differentiate between owner-controlled and manager-controlled firms was obtained from the companies' filings with the SEC as summarized by *Value Line*. The company's observed sales and profits for the test period were gathered from Compustat tapes.

Top executive compensation data were collected from *Forbes*. The annual dollar amounts paid to top-level executives are filed annually in the proxy statement with the SEC. A compilation of that information is published annually by *Forbes*. This source was also used by Boys and Schlagenhauf (1979), Ciscel and Carroll (1980), and Abdel-khalik (1984) in their studies. To avoid any noise from changes in top executives, only the same individual who occupied the top position during the period of study was included in the sample.

Summary

The model was estimated separately for each of the three years 1980 to 1982. On average, the overall sample consisted of 300 firms. The sample size changed a little from one year to another due to missing data.

Focusing on the relationship between the characteristics of top executive compensation and the company's target setting, this study seeks to fill the gap by answering such questions as the following. To what extent are the top executive's salary and bonus related to the achievement of the company's target performance? And how is this relationship influenced by the ownership structure of the company?

CHAPTER V
RESULTS

The data included more than 300 companies, each over a three-year period (1980-1982). Since the focus is on profit-based bonus, only profitable firms (profits > 0) were included for ease of measurement and interpretation. Table 1 shows the number of firms in each year.

Table 1 Number of Profitable Firms

Year	Profits > 0
1980	296
1981	298
1982	279

To assess the adequacy of the general model, $C_{it} = a_0 + a_1 S_{it} + a_2 D_{it} + e_{it}$, the collinearity between the independent variables was analyzed. D_{it} is the achievement of the profit target by firm i in period t, which is equal to the difference between observed profits of the year and the analyst's forecast of the firm's profits published in the first quarter of the year, i.e.,

$D_{it} = P_{it} - F_{it}$. S_{it} is the observed sales of firm i in period t.

A correlation measure between D_{it} and S_{it} indicates the closeness of the linear relationship between the two variables. A correlation of 1.00 means that one variable can be expressed exactly as a linear function of the other, while a correlation of 0 between two variables means that each has no linear association with the other. Table 2 presents the correlation between D_{it} and S_{it} from 1980 to 1982.

Table 2 Correlation Between Budget Achievement and Observed Sales

Year	Correlation between D_{it} and S_{it}
1980	0.615 **
1981	-0.408 **
1982	-0.806 **

Note: ** Significant at 1 percent level.

Significant correlations were found between the independent variables. The possibility of a high degree of collinearity means that tests for the significance of individual variables in the regression model may be unreliable. To avoid the collinearity problem, some transformation of the variables is necessary.

This study used a residual approach to control the multicollinearity problem. To get residual sales, S'_{it}, observed sales S_{it} was regressed against the budget achievement variable, D_{it}, as follows:

$$S_{it} = b_0 + b_1 D_{it} + S'_{it}$$

The residual of this regression, S'_{it}, was used as a substitute for S_{it} in the basic model. The modified model becomes:

$$C_{it} = a_0 + a_1 D_{it} + a_2 S'_{it} + e_{it}$$

Since residual sales was, by definition, uncorrelated with the budget achievement variable, replacing observed sales by residual sales fully controlled the problem of multicollinearity. Residual sales may be interpreted as the sales outcome to be rewarded after a certain level of profit is considered. Profits achievement is considered here to be the primary variable in compensation determination. The modified model examines the importance of the achievement of the profit target and the additional sales performance of the company.

Besides collinearity, another statistical problem mentioned in most of the literature on executive compensation was heteroscedasticity. The test for heteroscedasticity used here was the Glejser test. The absolute value of the residuals was regressed on some form of the size proxy suggested in the literature, square root of assets, assets and sales. The Glejser test can be written as:

$$e_{it} = d_0 + d_1 X_{it}$$

where X_{it} represents the above mentioned size proxy. The result of the test indicated that the null hypothesis of homoscedasticity was rejected with 90 percent confidence level for all of the three years if sales is used as the scale proxy. When X_{it} represented the company's sales, the parameter d_1 appeared to be significant at the 5 percent level in 1980, at the 1 percent level in 1981, and at the 6 percent level in 1982. When assets or square root of assets were used as a scale proxy (X_{it}), the homoscedasticity hypothesis was not rejected in both the 1980 and 1982 model. Therefore, sales, S_{it}, was adopted as a proxy of the company's size to control the heteroscedasticity problem in this study. The modified model becomes:

$$\frac{C_{it}}{S_{it}} = a_0 \frac{1}{S_{it}} + a_1 \frac{D_{it}}{S_{it}} + a_2 \frac{S'_{it}}{S_{it}} + \frac{e_{it}}{S_{it}} \qquad \text{(Model 1)}$$

where

C_{it} is the top executive's salary and bonus;

D_{it} is the achievement of the profit target, i.e.,

$D_{it} = P_{it} - F_{it}$;

S'_{it} is the residual outcome of sales,

$S'_{it} = S_{it} - b_0 - b_1 D_{it}$;

S_{it} is the company's observed sales; and

e_{it} is the residual term.

It should be noted that the alternative hypothesis is nondirectional because of the uncertainty about the extent to which wide variations in executive compensation across firms may influence the direction of the parameter. In particular, executives in large firms getting a penalty due to negative achievement may still have relatively higher compensation than executives in small firms getting a reward because of positive budget achievement. The results of this regression are presented in Table 3.

Table 3 Regression Results of Executive Compensation for Model 1

Year	a_0 (t)	$a_1(D_{it})$ (t)	$a_2(S'_{it})$ (t)	R^2	F
1980	494.78 (36.81)**	0.03 (0.78)	0.01 (13.52)**	0.56	190.62**
1981	604.12 (37.25)**	-0.58 (-7.97)**	0.004 (6.62)**	0.35	79.31**
1982	605.57 (35.83)**	-0.24 (-11.42)**	0.01 (8.75)**	0.43	102.78**

Notes: (1) ** Significant at 1 percent level.
(2) * Significant at 5 percent level.

The coefficient for D_{it} is significant at the 1 percent level for 1981 and 1982, although not in 1980.

The constant term, a_0, which can be considered as the influence of the average rents in the market for managerial talent, is significant at the 1 percent level for all three years. The coefficient for the residual of sales, a_2, also appears to be significant at the 1 percent level for all three years. Therefore, three influences--the average rents in the market for management skills, achievement of the profit target, and the sales volume in addition to the maintenance of certain profit requirements--are important variables in determining top executive's salary and bonus pay.

The second hypothesis examines the influence of the ownership of the company. The sample firms are partitioned into owner-controlled and manager-controlled firms. Manager-controlled firms include those with less than 5 percent insider holdings. Owner-controlled firms include those with more than 10 percent insider holdings. Table 4 presents the number of firms in each subgroup.

Table 4 Number of Firms in Manager-Controlled and Owner-Controlled Groups

Year	Manager-Controlled	Owner-Controlled
1980	132	126
1981	133	126
1982	117	122

Model 1 was estimated for these two groups of firms. The results are indicated in Tables 5 and 6. Manager-controlled firms indicate better regression fits than owner-controlled firms for all three years. The R^2 statistics for manager-controlled firms are larger than those in owner-controlled firms in all subgroups. If compared with the results of the sample without partition (Table 3), the manager-controlled firms had better regression fits than nonpartitioned firms for all the periods.

The consistently significant coefficients for the budget achievement variable in the testing period in manager controlled firms indicate that the profit target plays an important role in executive's compensation distribution in these firms. On the other hand, the owner-controlled firms have insignificant coefficients for the budget achievement variable in 1980 and 1981. The

Table 5 Regression Results of Executive Compensation for Manager-Controlled Firms: Model 1

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	510.46 (23.82)**	0.28 (8.23)**	0.01 (10.83)**	0.62	107.15**
1981	623.63 (26.46)**	-0.66 (-7.90)**	0.003 (4.64)**	0.45	53.27**
1982	640.51 (24.27)**	-0.23 (-8.79)**	0.01 (6.92)**	0.49	54.98**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

Table 6 Regression Results of Executive Compensation for Owner-Controlled Firms: Model 1

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	427.59 (29.54)**	0.11 (1.06)	0.02 (5.29)**	0.26	21.54**
1981	504.15 (23.05)**	0.36 (1.28)	0.02 (4.90)**	0.18	14.04**
1982	486.46 (25.21)**	-0.70 (-4.10)**	0.02 (3.52)**	0.27	21.67**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

null hypothesis that there is no difference between the manager-controlled and the owner-controlled firms in the sense of adopting the budget-based compensation system system can be rejected. Manager-controlled firms appear to be more adherent to the budgetary control incentive scheme than the owner-controlled firms.

The general model discussed in Chapter 3, $C_{it} = a_0 + a_1Y_t + a_2(Y_t - F_t)$ suggests that the parameter for the budget achievement variable should be positive. However, the possibility of wide variation in executive compensation across firms leads the direction of the sign undeterminable.

To assess the effect of reward/penalty due to positive/negative budget achievement, model 2 incorporates some aspect of the time-series function by using the changes of executive compensation as a measure of the dependent variable. Since executive compensation is noncomparable among firms, a relative measure is necessary to ease the disfunctional effect caused by cross-sectional tests. Model 2 was tested with the third and fourth hypothesis.

The third hypothesis examined the relationship between executive's reward or penalty and the positive or negative budget achievements. Each firm's annual pay was compared to its average pay to assess the reward or penalty on a relative level. Such a relative measure enabled a more uniform treatment across firms. The dependent variable R_{it} was computed as follows:

$$R_{it} = C_{it} - (C_{i(t-1)} + C_{it} + C_{i(t+1)}) / 3$$

The regression function was

$$R_{it} = b_0 + b_1 D_{it} + b_2 S'_{it} + e_{it}$$

For those firms which have positive budget achievements, D_{it} equals the observed profits minus the budget profits, i.e., $D_{it} = P_{it} - F_{it}$. The parameter b_1 for this group of firms is expected to be positive, i.e., $b_1 > 0$. That is, executives attaining positive budget achievements are expected to be rewarded by their board of directors. On the other hand, for those firms which have negative budget achievements, D_{it} is now defined as budgeted profits minus observed profits, i.e., $D_{it} = F_{it} - P_{it}$. The parameter b_1 for this group of firms is expected to be negative, i.e., $b_1 < 0$. In other words, executives attaining negative budget achievements are expected to be penalized by the board of directors.

Again, the same control procedure as used in Model 1 was followed to correct the statistical problems. That is, residual sales was used as the independent variable and observed sales was employed as the scale proxy to deflate the regression equation. The model examined is as follows:

$$\frac{R_{it}}{S_{it}} = b_0 \left(\frac{1}{S_{it}}\right) + b_1\left(\frac{D_{it}}{S_{it}}\right) + b_2\left(\frac{S'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} \quad \text{(Model 2)}$$

where $D_{it} = P_{it} - F_{it}$ if $P_{it} > F_{it}$; otherwise, $D_{it} = F_{it} - P_{it}$.

The number of firms in each group is indicated in Table 7.

Table 7 Number of Firms in Positive and Negative Budget Achievement Groups

Year	Positive Budget Achievement	Negative Budget Achievement
1980	170	123
1981	139	157
1982	57	219

The results of this test are presented in Tables 8 and 9.

As is expected, b_1 for the positive achievement group is positive for three years, with two years' results being significant. On the other hand, b_1 for the negative budget achievement group is negative in 1980 and 1982. Although b_1 has an unexpected sign in the 1981 negative group, it is insignificant. Moreover, b_1 in this particular subgroup has a very small value, 0.005, which

Table 8 Regression Results of Executive Compensation for Positive Budget Achievement Firms: Model 2

Year	b_0 (t)	$b_1(D_{it})$ (t)	$b_2(S'_{it})$ (t)	R^2	F
1980	-72.04 (-7.69)**	0.04 (2.07)*	0.0008 (1.42)	0.10	9.19**
1981	40.08 (4.26)**	0.22 (2.28)*	-0.002 (-3.97)**	0.11	8.48**
1982	47.91 (3.97)**	0.66 (1.66)	0.004 (3.77)**	0.26	9.58**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

Table 9 Regression Results of Executive Compensation for Negative Budget Achievement Firms: Model 2

Year	b_0 (t)	b_1 (t)	b_2 (t)	R^2	F
1980	-27.10 (-3.12)**	-0.31 (-3.96)**	-0.009 (-5.08)**	0.35	33.20**
1981	7.92 (1.13)	0.005 (0.20)	-0.0007 (-3.58)**	0.08	6.63**
1982	37.33 (4.80)**	-0.02 (-1.81)	0.005 (7.70)**	0.23	32.35**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

is less than all the reward parameters in the positive achievement groups.

The results of this test indicate that firms with observed profits higher than their budgets give executives rewards. On the other hand, firms with realized profits less than their budgets penalize their executives.

Although the sign of the parameter b_1 supported the alternative hypothesis, the correlation coefficient R^2 was not quite satisfactory in this test. A partition of the firms into owner-controlled and manager-controlled groups was exercised to assess the difference in the effectiveness of budget-based compensation practice caused by the ownership structure of the firm. The manager-controlled firms were expected to show better "model fit" results than the nonpartitioned sample, which in turn should be better than the owner-controlled firms. The following tables (Tables 10 - 14) present the number of firms in each subgroup and the results of this test.

The number of owner-controlled and manager-controlled firms in each year's comparable groups is not much different. The regression results indicate that manager-controlled firms have better regression fits than owner-controlled firms. The model fits (R^2) for owner-controlled firms are very small in all but one subgroup. The F statistics are also insignificant in five subgroups of the owner-controlled firms. In addition, the

Table 10 Number of Firms Classified According to Insider Ownership and Budget Achievement

Year	Manager-Controlled		Owner-Controlled	
	Positive Achievement	Negative Achievement	Positive Achievement	Negative Achievement
1980	76	54	72	52
1981	54	77	64	61
1982	17	98	31	89

Table 11 Regression Results of Executive Compensation for Manager-Controlled Firms with Positive Budget Achievement: Model 2

Year	b_0 (t)	b_1 (t)	b_2 (t)	R^2	F
1980	-67.57 (-4.17)**	0.06 (2.84)**	0.0007 (0.86)	0.10	4.08*
1981	33.07 (3.00)**	0.28 (3.00)**	-0.002 (-4.93)**	0.34	13.40**
1982	71.16 (4.23)**	0.41 (1.03)	0.003 (3.58)**	0.47	6.70**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

Table 12 Regression Results of Executive Compensation for Owner-Controlled Firms with Positive Budget Achievement: Model 2

Year	b_0 (t)	b_1 (t)	b_2 (t)	R^2	F
1980	-48.24 (-4.58)**	-0.02 (-0.25)	-0.003 (-1.82)	0.06	2.37
1981	34.40 (2.07)*	-0.03 (-0.11)	-0.0001 (-0.06)	0.0002	0.007
1982	47.48 (2.30)*	-0.90 (-0.64)	-0.0004 (-0.05)	0.01	0.21

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

Table 13 Regression Results of Executive Compensation for Manager-Controlled Firms with Negative Budget Achievement: Model 2

Year	b_0 (t)	b_1 (t)	b_2 (t)	R^2	F
1980	-30.47 (-3.28)**	-0.55 (-7.54)**	-0.005 (-3.01)**	0.66	50.65**
1981	3.77 (0.31)	0.01 (0.27)	-0.0007 (-2.54)*	0.08	3.22*
1982	39.93 (3.08)**	-0.01 (-1.22)	0.005 (6.05)**	0.30	20.93**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

Table 14 Regression Results of Executive Compensation for Owner-Controlled Firms with Negative Budget Achievement: Model 2

Year	b_0 (t)	b_1 (t)	b_2 (t)	R^2	F
1980	-55.30 (-5.44)**	0.43 (3.74)**	-0.004 (-0.74)	0.24	7.87**
1981	19.45 (2.65)*	-0.174 (-1.61)	0.003 (1.38)	0.05	1.64
1982	26.03 (2.61)*	0.11 (1.47)	0.002 (0.71)	0.04	1.71

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

sign of b_1 in these firms is not consistent with the theoretical model and is insignificant in five subgroups. Only one subgroup in Table 14 of owner-controlled firms indicates a significant b_1. However, the sign of this b_1 is inconsistent with the theoretical compensation function. Having a positive and significant b_1 in this particular subgroup does not mean owner-controlled firms reward their top executives for negative budget achievements. It is possible that owner-controlled firms incorporate budgets in their compensation system in a different manner. Future research can be done to examine the compensation model in owner-controlled firms.

On the other hand, manager-controlled firms appear to adhere more closely to budget-based compensation systems than owner-controlled firms. Within the manager-controlled firms, only the negative budget achievement firms in 1981 do not show an expected sign, but the value of this parameter is insignificant and also is less than the value of b_1 in the positive budget achievement group in the same year. As a result, the null hypothesis of no difference between the owner-controlled and manager-controlled firms in their reward and penalty functions can be rejected.

The results in the main text of this study use salary plus bonus only as the measure of executive compensation. It is suggested (Lewellen and Huntsman, 1970; Ciscel and Carroll, 1980) that this simple measure contains less noise than other measures, e.g., those that include contingent compensation and stock gains. Stock gain has been noted to be the most noisy factor in the compensation studies. Regression tests with compensation measures containing stock gain were found to yield the worst regression fits. Authors of the above studies also argued that stock price variations may not provide reliable feedback on the quality of a manager's decisions and exerted efforts.

However, no matter how close salary and bonus is related to top executive performance, it is not a comprehensive measure of compensation. Top executives are also paid by benefits, contingent compensations, and stock gains for their contribution to the company. Different packages of compensation may be partially related to current performance. Therefore, they are examined in the appendices.

Appendix A uses two different measures of top executive compensation to examine all the hypotheses in this study. One of the measures is the sum of top executive salary and bonus, benefits, and contingent compensation. This measure does not include stock gain and thus is not affected by the market fluctuations. Another measure considered is the total compensation of the top executive officer. Total compensation is the sum of salary and bonus, benefits, contingent compensation, and stock gain, and is therefore the most comprehensive measure.

Tables A-1, A-2-1, and A-2-2 test the first and second hypotheses with the subtotal measure of top executive compensation. The results support the first and second hypotheses. Top executive compensation appears to be significantly influenced by the budget achievement variable. The effect is much stronger in manager firms than in owner firms.

Tables A-3, A-4-1, and A-4-2 test the first and second hypotheses with the total measure of top executive compensation. The budget achievement variable has a significant effect on manager firms, while an insignificant effect was found in owner firms. These results are consistent with the findings in the main text. This evidence suggests that manager firms and owner firms appear to utilize different compensation systems.

To assess the effect of positive and negative achievement on top executive compensation, model 2 was also examined with (1) the subtotal measure, and (2) the total measure of compensation. Tables A-5-1 and A-5-2 present the results of using subtotal measures. Significant and positive parameters are found in one year only for the positive budget achievement firms. Significant and negative parameters also appear in one year only for the negative budget achievement firms.

Firms were further partitioned into manager firms and owner firms to examine the effect of ownership. Tables A-6-1 and A-7-1 present the results for manager firms which can be compared to Tables A-6-2 and A-7-2 for owner firms. The results indicate a better regression fit in manager firms in both positive and negative achievement groups. Manager firms have more consistent signs in both groups. Although only two out of six groups in manager firms have significant statistics, these results provide some evidence of differential assessment between manager firms and owner firms.

Tables A-8-1 and A-8-2 examine the effect of positive and negative budget achievement on total compensation. The parameters for the positive budget achievement variable are positive in all years and negative for negative groups in all years. Three out of six groups have significant statistics. Again, this test provides evidence of different treatment of positive and negative achievements.

Tables A-9-1, A-9-2, A-10-1, and A-10-2 partition the firms into manager firms and owner firms and test the effect of positive and negative achievement on total compensation in different firms. Manager firms appear to have consistent and more significant signs for the budget achievement variable. On the other hand, owner firms show inconsistent and insignificant signs for the budget achievement variable in all years. These results indicate a difference between manager firms and owner firms in their total compensation awards.

Research studies (Lewellen and Huntsman, 1970; Smyth, Boyes and Peseau, 1975; Ciscel and Carroll, 1980) that question the company's profit maximization and sales maximization objectives have used assets or square root of assets as a surrogate of company's size to control the heteroscedasticity problems. These two variables are not significantly correlated with the residual term in this study. Instead, sales is found to be a significant factor for all years; therefore sales is used as a deflator in the main text.

If assets or square root of assets is used, the result still supports the hypothesis that budget achievement is a significant variable for top executive compensation. Tables B-1, B-2, and B-3 present the results of using assets as a deflator for three different measures of top executive compensation. Tables B-4, B-5, and B-6 present the results of using square root of assets as a deflator for different measures of top executive compensation.

Appendix C measures the budget achievement variable in a different manner. Both sales budget and profit budget are treated as important targets for the company. There is no a priori evidence to ascertain which one is the more important variable for compensation decisions. The profit budget is treated as primary in the main text of this study because both sales maximization and cost saving are considered as appropriate objectives of the company. However, if only the sales target is evaluated, the budget achievement variable should be the difference between observed sales and budgeted sales. Table C-1 tests model 1 by using budget achievement on sales and the additiinal performance on profits. Salary and bonus was used to measure top executive compensation in Table C-1 while Table C-2 and C-3 used the subtotal and total measure of top executive compensation.

Profit budgets are derived from sales budgets. If one taaget is tied to top executive compensation, the other target should also be correlated with compensation. Appendix C provides evidence for consistency. The results indicate that budget achievement variables are significant factors for the compensation function.

In summary, the appendices use other measures of different variables that have been argued by other studies as better measurements for certain aspects. The results support the findings in the main text of this study.

CHAPTER VI
SUMMARY AND CONCLUSIONS

This study was undertaken to ascertain whether top executive compensation was influenced by target earnings and whether the degree of separation of ownership from control produced different performance evaluation behavior in business. The major findings of this study were as follows:

1. Firms appeared to compensate their executives based on profit targets and sales volume (in addition to the profit level achievement).
2. The compensation practices in manager-controlled firms were significantly different from those in owner-controlled firms. The results of this study support the hypothesis that the tendency to use target earnings to evaluate executives was dependent on the type of control in the firm. Ownership of the firms played an important role in executive compensation decisions.
3. Executives appeared to be rewarded or penalized according to their degree of budget achievement. Executives with positive budget achievement received higher than average compensation and this can be attributed to a reward parameter associated with the budget achievement variable. On the other hand,

executives with a negative budget achievement received lower than average compensation, which was attributable to a penalty associated with the budget achievement variable.

4. When firms were further partitioned into manager-controlled and owner-controlled firms to assess the effect of reward and penalty, a significant difference was found between these different groups of firms. Based on the consistently better model fit results for the manager-controlled firms, the null hypothesis that a firm's ownership has no influence on executive's reward or penalty distribution can be rejected. The compensation functions of manager-controlled firms exhibited stronger budget-based relationships.

The results of this study provide empirical evidence which indicates the importance of the company's budget constraints and its ownership in explaining top executive compensation. The budget variable is being treated as an important motivational tool in manager-controlled firms and thus becomes a crucial factor in the executive compensation function.

This study examined only the incentive compensation schemes for top executives. The incentives for divisions in relation to company headquarters may not fit this model. The headquarters-division situation also involves incentives for coordination between several divisions, hence the degree of decentralization would probably matter in the incentive design for lower-level managers. These problems are not considered in this study. Further research can address this area. A caveat that bears mention is that the compensation committee is assumed to be relatively independent of management in manager-controlled firms. This assumption has not been empirically verified.

There may be other omitted variables and explanations that influence managerial compensation. An alternative explanation of observed results that executive compensation schemes in manager firms adhere more closely to budget-based contracts could be attributed to the manager's bonding behavior. Note that top management compensation is required to be published in proxy statements and filed with the SEC. If the compensation is too high and appears unrelated to performance, stockholders would voice their criticism. Managers thus have incentives to substantiate that their compensation is nondiscretionary. Hence, appearing to adhere to a formalized compensation system is in their self-interest, and one would therefore observe greater reliance on budget-based systems in manager-controlled firms.

The model used in this study is just an approximating function that one hopes adequately captures the most important ingredients. One obviously cannot expect the same functional form for compensation contracts across all firms. To identify the individual models used by individual firms is not the purpose of the current study. The primary purpose of this study is to test the descriptive validity of the budget-based schemes which have theoretical support in cases where significant information asymmetry exists (as in the top manager versus owner conflict). When data becomes available for a longer period of time for the same firm, then a time-series test can be run to check on the apparent use of individual models for each firm, budget-based or otherwise.

APPENDIX A

A DIFFERENT MEASURE OF EXECUTIVE COMPENSATION

Table A-1 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits: Model 1

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	619.57 (31.63)**	0.21 (4.01)**	0.01 (7.26)**	0.42	105.05**
1981	733.19 (35.52)**	-0.47 (-5.09)**	0.007 (10.59)**	0.40	96.83**
1982	754.04 (30.66)**	-0.35 (-11.44)**	0.01 (5.69)**	0.37	81.20**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{S_{it}} = a_0\left(\frac{1}{S_{it}}\right) + a_1\left(\frac{D_{it}}{S_{it}}\right) + a_2\left(\frac{S'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} .$$

(4) C_{it} is defined as the sum of top executive's salary, bonus, fringe benefits, and contingent compensations.

(5) This table examines the first hypothesis by using a different measure of the dependent variable. The results support the first alternative hypothesis.

Table A-2-1 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Manager-Controlled Firms: Model 1

Year	a_0	a_1	a_2	R^2	F
1980	631.90 (23.60)**	0.41 (9.62)**	0.01 (6.71)**	0.55	79.39**
1981	767.87 (28.77)**	-0.56 (-5.90)**	0.006 (9.08)**	0.53	74.98**
1982	815.06 (23.82)**	-0.32 (-9.56)**	0.010 (4.55)**	0.47	50.86**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{S_{it}} = a_0\left(\frac{1}{S_{it}}\right) + a_1\left(\frac{D_{it}}{S_{it}}\right) + a_2\left(\frac{S'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} .$$

(4) C_{it} is defined as the sum of top executive's salary, bonus, fringe benefits, and contingent compensation.

(5) Sample firms are partitioned into manager-controlled and owner-controlled firms.

(6) Table A-2-1 and Table A-2-2 examine the second hypothesis by using a different measure of the dependent variable. The results support the second alternative hypothesis.

Table A-2-2 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Owner-Controlled Firms: Model 1

Year	a_0	a_1	a_2	R^2	F
1980	518.91 (17.99)**	0.15 (0.77)	0.02 (3.72)**	0.15	10.77**
1981	591.57 (18.50)**	0.37 (0.88)	0.03 (5.20)**	0.19	14.89**
1982	550.56 (19.45)**	-0.78 (-3.11)**	0.04 (6.22)**	0.36	34.17**

Notes:
(1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model in Table A-2-1.

(4) The sum of top executive's salary, bonus, contingent compensation, and fringe benefits in owner-controlled firms are examined.

Table A-3 Regression Results of Executive Compensation Based on Total Compensation: Model 1

Year	a_0	a_1	a_2	R^2	F
1980	701.52 (17.40)**	1.28 (11.78)**	0.01 (4.05)**	0.59	213.11**
1981	890.98 (11.29)**	-0.28 (-0.79)	0.005 (2.07)*	0.02	3.36*
1982	944.32 (9.11)**	-0.24 (-1.85)	0.008 (0.96)	0.02	2.16

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{S_{it}} = a_0(\frac{1}{S_{it}}) + a_1(\frac{D_{it}}{S_{it}}) + a_2(\frac{S'_{it}}{S_{it}}) + \frac{e_{it}}{S_{it}} .$$

(4) C_{it} is defined as top executive's total compensation, including salary, bonus, fringe benefits, contingent compensations and stock gains.

(5) This table examines the first hypothesis by using total compensation as the dependent variable.

Table A-4-1 Regression Results of Executive Compensation Based on Total Compensation for Manager-Controlled Firms: Model 1

Year	a_0	a_1	a_2	R^2	F
1980	681.87 (10.58)**	1.54 (15.14)**	0.01 (3.09)**	0.66	128.46**
1981	833.33 (23.19)**	-0.49 (-3.84)**	0.006 (5.91)**	0.33	31.81**
1982	940.39 (20.35)**	-0.25 (-5.46)**	0.007 (2.55)*	0.22	16.51**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{S_{it}} = a_0\left(\frac{1}{S_{it}}\right) + a_1\left(\frac{D_{it}}{S_{it}}\right) + a_2\left(\frac{S'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} .$$

(4) C_{it} is defined as top executive's total compensation.

(5) Sample firms are partitioned into manager-controlled and owner-controlled firms.

(6) Table A-4-1 and Table A-4-2 examine the second hypothesis by using total compensations as the dependent variable. The results support the second alternative hypothesis.

Table A-4-2 Regression Results of Executive Compensation Based on Total Compensation for Owner-Controlled Firms: Model 1

Year	a_0	a_1	a_2	R^2	F
1980	606.80 (11.01)**	0.52 (1.37)	0.05 (4.75)**	0.24	19.15**
1981	710.60 (15.47)**	0.49 (0.82)	0.02 (3.25)**	0.09	6.15**
1982	668.60 (13.53)**	-0.64 (-1.47)	0.06 (4.47)**	0.19	14.85**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model in Table A-4-1.

(4) Top executive's total compensation in the owner-controlled firm is examined.

Table A-5-1 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Positive Budget Achievement Firms: Model 2

Year	b_0	b_1	b_2	R^2	F
1980	-82.88 (-5.64)**	-0.05 (-1.67)	0.001 (1.11)	0.02	1.39
1981	55.70 (4.05)**	0.17 (1.23)	-0.002 (-2.84)**	0.06	4.08*
1982	75.35 (4.26)**	1.33 (2.27)*	0.004 (2.77)**	0.21	7.51**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{R_{it}}{S_{it}} = b_0\left(\frac{1}{S_{it}}\right) + b_1\left(\frac{|D_{it}|}{S_{it}}\right) + b_2\left(\frac{S'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} .$$

(4) $R_{it} = C_{it} - (C_{i(t-1)} + C_{it} + C_{i(t+1)})/3,$

C_{it} is defined as the sum of salary, bonus, fringe benefits and contingent compensation.

(5) Sample firms are partitioned into positive budget achievement and negative achievement firms.

(6) Table A-5-1 and Table A-5-2 examine the third hypothesis by using a different measure of the dependent variable. The results support the third alternative hypothesis.

Table A-5-2 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Negative Budget Achievement Firms: Model 2

Year	b_0	b_1	b_2	R^2	F
1980	-36.72 (-2.79)**	-0.39 (-3.22)**	-0.008 (-3.23)**	0.22	16.77**
1981	6.53 (0.80)	-0.02 (-0.58)	0.0006 (2.86)**	0.05	4.09*
1982	41.77 (3.21)**	0.004 (0.27)	0.006 (5.92)**	0.14	17.54**

Note: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-5-1.

(4) Firms with negative budget achievements are examined.

Table A-6-1 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Manager-Controlled Firm with Positive Budget Achievement: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-97.05 (-4.99)**	-0.01 (-0.43)	0.001 (1.23)	0.03	0.99
1981	60.11 (3.93)**	0.26 (2.02)*	-0.003 (-4.09)*	0.25	8.69**
1982	124.23 (4.18)**	0.82 (1.17)	0.003 (1.67)	0.21	1.95

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-5-1.

(4) Firms with positive budget achievements are partitioned into manager-controlled and owner-controlled firms.

(5) Tables A-6-1, A-6-2, A-7-1, and A-7-2 examine the fourth hypothesis by using a different measure of the dependent variable. The results support the fourth alternative hypothesis.

Table A-6-2 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Owner-Controlled Firm with Positive Budget Achievement: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-20.59 (-0.73)	-0.17 (-1.05)	-0.008 (-1.88)	0.10	4.03*
1981	56.11 (2.06)*	-0.47 (-1.23)	-0.002 (-0.53)	0.03	0.86
1982	78.93 (2.74)*	-1.64 (-0.85)	-0.003 (-0.35)	0.03	0.45

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-5-1.

(4) Owner-controlled firms with positive budget achievements are examined.

Table A-7-1 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Manager-Controlled Firm with Negative Budget Achievement: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-51.83 (-21.84)**	-0.63 (-4.44)**	-0.003 (-1.01)	0.36	14.60**
1981	9.80 (0.72)	-0.02 (-0.40)	0.0006 (2.01)*	0.05	2.03
1982	52.31 (2.92)**	0.001 (0.08)	0.006 (5.26)**	0.23	14.18**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-5-1.

(4) Firms with negative budget achievements are partitioned into manager-controlled and owner-controlled firms.

Table A-7-2 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits for Owner-Controlled Firms with Negative Budget Achievements: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-58.83 (-4.54)**	0.43 (2.92)**	-0.006 (-0.95)	0.17	5.25**
1981	12.84 (1.15)	-0.27 (-1.66)	0.008 (2.16)*	0.009	2.75
1982	8.48 (0.34)	0.07 (0.36)	0.02 (3.12)**	0.11	5.57**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model in Table A-5-1.

(4) Negative budget achievements in owner-controlled firms are examined.

Table A-8-1 Regression Results of Executive Compensation Based on Total Compensation for Positive Budget Achievement Firms: Model 2

Year	b_0	b_1	b_2	R^2	F
1980	-164.11 (-2.44)*	0.77 (5.13)**	0.003 (0.71)	0.25	28.41**
1981	125.27 (0.95)	0.34 (0.26)	-0.006 (-0.81)	0.005	0.33
1982	131.12 (2.87)**	1.68 (1.11)	0.002 (0.47)	0.03	0.81

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following:

$$\frac{R_{it}}{S_{it}} = b_0\left(\frac{1}{S_{it}}\right) + b_1\left(\frac{|D_{it}|}{S_{it}}\right) + b_2\left(\frac{S'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} .$$

(4) $R_{it} = C_{it} - (C_{i(t-1)} + C_{it} + C_{i(t+1)})/3$,

C_{it} is defined as total compensation.

(5) Sample firms were partitioned into positive budget achievement firms and negative budget achievement firms.

(6) Table A-8-1 and Table A-8-2 examine the third hypothesis by using total compensation as the dependent variable. The results support the third alternative hypothesis.

Table A-8-2 Regression Results of Executive Compensation Based on Total Compensation for Negative Budget Achievement Firms: Model 2

Year	b_0	b_1	b_2	R^2	F
1980	-55.68 (-2.74)**	-0.46 (-2.48)*	-0.005 (-1.24)	0.09	5.86**
1981	-5.44 (-0.22)	-0.18 (-1.91)	-0.006 (-8.62)**	0.37	45.29**
1982	76.65 (0.81)	-0.26 (-2.39)*	0.008 (1.13)	0.03	3.70*

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-8-1.

(4) Firms with negative budget achievements are examined.

Table A-9-1 Regression Results of Executive Compensation Based on Total Compensation for Manager-Controlled Firm with Positive Budget Achievement: Model 3

Year	a_0	a_1	a_2	R^2	F
1980	-146.77 (-1.89)	0.84 (7.89)**	0.002 (0.37)	0.46	31.87**
1981	66.75 (1.60)	0.06 (0.17)	-0.002 (-1.30)	0.03	0.87
1982	236.04 (2.33)*	1.06 (0.44)	-0.002 (-0.42)	0.03	0.20

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-8-1.

(4) Firms with positive budget achievements are partitioned into manager-controlled and owner-controlled firms.

(5) Tables A-9-1, A-9-2, A-10-1, and A-10-2 examine the fourth hypothesis by using total compensation as the dependent variable. The results support the fourth alternative hypothesis.

Table A-9-2 Regression Results of Executive Compensation Based on Total Compensation for Owner-Controlled Firm with Positive Budget Achievement: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-46.89 (-1.10)	0.16 (0.65)	0.01 (1.54)	0.06	2.31
1981	72.79 (1.98)	0.28 (0.55)	-0.02 (-4.95)**	0.29	12.62**
1982	176.78 (3.08)**	-4.43 (-1.15)	-0.02 (-1.17)	0.09	1.49

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-8-1.

(4) Firms with positive budget achievements are partitioned into manager-controlled and owner-controlled firms.

Table A-10-1 Regression Results of Executive Compensation Based on Total Compensation for Manager-Controlled Firm with Negative Budget Achievement: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-88.03 (-3.53)**	-0.70 (-3.61)**	0.002 (0.35)	0.22	7.29**
1981	-3.91 (-0.09)	-0.24 (-1.79)	-0.006 (-6.31)**	0.38	22.86**
1982	95.87 (2.51)*	-0.26 (-7.34)**	0.008 (3.39)**	0.44	38.04**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-8-1.

(4) Firms with negative budget achievements are partitioned into manager-controlled and owner-controlled firms.

Table A-10-2 Regression Results of Executive Compensation Based on Total Compensation for Owner-Controlled Firm with Negative Budget Achievement: Model 2

Year	a_0	a_1	a_2	R^2	F
1980	-71.82 (-1.94)	0.50 (1.20)	0.02 (0.94)	0.04	1.00
1981	-12.58 (-0.48)	0.20 (0.53)	-0.0001 (-0.01)	0.005	0.16
1982	-3.85 (-0.10)	-0.15 (-0.53)	0.01 (1.64)	0.03	1.36

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table A-8-1.

(4) Firms with negative budget achievements are partitioned into manager-controlled and owner-controlled firms.

APPENDIX B
A DIFFERENT DEFLATING VARIABLE

Table B-1 Regression Results of Executive Compensation Including Salary and Bonus Only: Model 1 Deflated by Assets

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	497.13 (37.18)**	0.07 (1.78)	0.01 (11.56)**	0.52	149.43**
1981	615.93 (38.12)**	-0.43 (-6.29)**	0.005 (9.92)**	0.34	71.37**
1982	618.13 (37.94)**	-0.23 (-10.18)**	0.01 (12.89)**	0.53	149.67**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{A_{it}} = a_0\left(\frac{1}{A_{it}}\right) + a_1\left(\frac{D_{it}}{A_{it}}\right) + a_2\left(\frac{S'_{it}}{A_{it}}\right) + \frac{e_{it}}{A_{it}} .$$

(4) C_{it} is defined as top executive's salary and bonus only.

(5) A_{it} is defined as the company's total assets.

Table B-2 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits: Model 1 Deflated by Assets

Year	a_0	a_1	a_2	R^2	F
1980	621.54 (31.02)**	0.23 (4.19)**	0.008 (5.50)**	0.34	71.58**
1981	739.97 (35.84)**	-0.47 (-5.35)**	0.007 (11.35)**	0.37	81.04**
1982	760.41 (31.82)**	-0.34 (-10.26)**	0.01 (8.66)**	0.43	100.15**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table B-1.

(4) C_{it} is defined as the sum of top executive's salary, bonus, fringe benefits and contingent compensation.

Table B-3 Regression Results of Executive Compensation Based on Total Compensation: Model 1 Deflated by Assets

Year	a_0	a_1	a_2	R^2	F
1980	705.14 (14.45)**	1.16 (8.55)**	0.007 (2.14)*	0.40	92.78**
1981	908.93 (10.61)**	-0.29 (-0.80)	0.004 (1.75)	0.01	1.90
1982	897.80 (26.24)**	-0.25 (-5.30)**	0.010 (5.21)**	0.19	30.69**

Notes:
(1) ** Significant at 1 percent level.
(2) * Significant at 5 percent level.
(3) The model estimated is the same as the model used in Table B-1.
(4) C_{it} is defined as top executive's total compensation.

Table B-4 Regression Results of Executive Compensation Including Salary and Bonus only: Model 1 Deflated by Square Root of Assets

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	487.59 (41.22)**	0.18 (3.34)**	0.009 (7.86)**	0.33	68.76**
1981	572.13 (39.78)**	-0.34 (-3.16)**	0.006 (7.72)**	0.21	37.98**
1982	575.32 (38.04)**	-0.28 (-7.14)**	0.01 (7.90)**	0.33	65.49**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{(A_{it}^{\frac{1}{2}})} = a_0 \frac{1}{(A_{it}^{\frac{1}{2}})} + a_1 \frac{D_{it}}{(A_{it}^{\frac{1}{2}})} + a_2 \frac{S'_{it}}{(A_{it}^{\frac{1}{2}})} + \frac{e_{it}}{(A_{it}^{\frac{1}{2}})} .$$

(4) C_{it} is defined as top executive's salary and bonus.

(5) $(A_{it}^{\frac{1}{2}})$ is defined as the square root of assets.

Table B-5 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits: Model 1 Deflated by Square Root of Assets

Year	a_0	a_1	a_2	R^2	F
1980	609.17 (31.26)**	0.34 (3.76)**	0.007 (3.63)**	0.17	28.47**
1981	701.06 (34.54)**	-0.29 (-1.95)	0.009 (7.98)**	0.20	35.91**
1982	706.27 (29.86)**	-0.40 (-6.54)**	0.01 (5.33)**	0.24	41.03**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table B-4.

(4) C_{it} is defined as the sum of top executive's salary, bonus, contingent compensation and fringe benefits.

Table B-6 Regression Results of Executive Compensation Based on Total Compensation: Model 1 Deflated by Square Root of Assets

Year	a_0	a_1	a_2	R^2	F
1980	725.08 (17.54)**	1.15 (6.02)**	0.010 (2.39)*	0.22	38.98**
1981	891.14 (10.10)**	0.10 (0.16)	0.007 (1.38)	0.007	0.95
1982	843.20 (24.40)**	-0.29 (-3.27)**	0.01 (3.72)**	0.10	14.20**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table B-4.

(4) C_{it} is defined as top executive's total compensation.

APPENDIX C
A DIFFERENT MEASURE OF EXECUTIVE PERFORMANCE

Table C-1 Regression Results of Executive Compensation Including Salary and Bonus Only as a Function of Sales Budget Achievement and Residual Profits

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	530.45 (35.95)**	0.03 (14.99)**	0.03 (2.49)*	0.44	115.06
1981	632.52 (37.38)**	-0.03 (-8.38)**	0.05 (5.07)**	0.25	50.34**
1982	639.96 (36.03)**	-0.02 (-7.49)**	0.08 (8.48)**	0.33	67.67**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the following model:

$$\frac{C_{it}}{S_{it}} = a_0\left(\frac{1}{S_{it}}\right) + a_1\left(\frac{N_{it}}{S_{it}}\right) + a_2\left(\frac{P'_{it}}{S_{it}}\right) + \frac{e_{it}}{S_{it}} .$$

(4) C_{it} is defined as top executive's salary and bonus.

(5) N_{it} is defined as the difference between the observed sales and the budgeted sales

Table C-1--continued

(analyst's forecast of sales in the first quarter).

(6) P'_{it} is defined as the residual profits; that is, $P'_{it} = P_{it} - (d_0 + d_1 N_{it})$.

(7) It is suggested that executives might be evaluated by the achievement of the sales budget and the additional achievement in cost saving (technical efficiency). There is no a priori reason to ascertain that sales budgets are more important than profits budgets in determining executive's performance. However, if sales budgets are used, the budget achievement variable still appears to be an important factor for top executive's pay.

Table C-2 Regression Results of Executive Compensation Including Salary, Bonus, Contingent Compensation and Benefits as a Function of Sales Budget Achievement and Residual Profits

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	642.33 (33.26)**	0.04 (13.74)**	0.02 (1.62)	0.39	95.48**
1981	774.49 (35.55)**	-0.03 (-8.47)**	0.08 (6.60)**	0.29	60.70**
1982	769.32 (31.88)**	-0.04 (-10.18)**	0.08 (6.51)**	0.36	76.86**

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table C-1.

(4) C_{it} is defined as the sum of top executive's salary, bonus, fringe benefits and contingent compensation.

Table C-3 Regression Results of Executive Compensation Based on Total Compensation as a Function of Sales Budget Achievement and Residual Profits

Year	a_0 (t)	a_1 (t)	a_2 (t)	R^2	F
1980	687.50 (18.50)**	0.12 (22.29)**	0.05 (1.82)	0.63	249.57**
1981	923.17 (11.97)**	-0.03 (-1.84)	0.05 (1.15)	0.02	2.47
1982	954.27 (9.48)**	-0.03 (-1.64)	0.06 (1.17)	0.02	2.14

Notes: (1) ** Significant at 1 percent level.

(2) * Significant at 5 percent level.

(3) The model estimated is the same as the model used in Table C-1.

(4) C_{it} is defined as top executive's total compensation.

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BIOGRAPHICAL SKETCH

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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